

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA**

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| CARNEGIE MELLON UNIVERSITY, |) | |
| |) | |
| Plaintiff, |) | |
| |) | |
| v. |) | Civil No. 09-290 |
| |) | Judge Nora Barry Fischer |
| MARVELL TECHNOLOGY GROUP, LTD., |) | |
| and MARVELL SEMICONDUCTOR, INC., |) | |
| |) | |
| Defendants. |) | |

MEMORANDUM OPINION

I. INTRODUCTION

Pending before the Court is Marvell Technology Group, Ltd. and Marvell Semiconductor, Inc.’s (collectively, “Marvell” or “Defendant”) “*Pro Forma* Motion for Reconsideration Re: Marvell’s Motion for Partial Summary Judgment of Patent Invalidity.” (Docket No. 339). Carnegie Mellon University (“CMU” or “Plaintiff”) has filed a brief in opposition (Docket No. 379). For the following reasons, the Court denies Marvell’s motion.

II. BACKGROUND

The background of this case has been discussed extensively elsewhere. (*See* Docket Nos. 306, 337). It is sufficient here to say that this is a patent infringement action in which CMU alleges that Marvell has infringed two of CMU’s patents. The first patent, U.S. Patent No. 6,201,839 (the “‘839 Patent”), claims a priority date of May 9, 1997. *See* ‘839 Patent at Col. 1, lns. 7-9. The ‘839 Patent is entitled “Method and Apparatus for Correlation-Sensitive Adaptive Sequence Detection.” *Id.* It issued on March 13, 2001. *Id.* CMU owns this patent by assignment. *Id.*

The second patent, U.S. Patent No. 6,438,180 (the “‘180 Patent”) is a continuation-in-part of the ‘839 Patent. ‘180 Patent at Col. 1., lns. 6-9. This patent is entitled “Soft and Hard Sequence Detection in ISI Memory Channels.” It was issued by the PTO on August 20, 2002. *See* ‘180 Patent. The inventors of this patent are also Kavcic and Moura, and CMU likewise owns this patent by assignment. *Id.* The Court will refer to both the ‘839 and ‘180 Patents collectively as the “CMU patents.”

After nearly a year of briefing and argument, the Court issued its opinion on Marvell’s first motion for partial summary judgment of invalidity on September 28, 2011. (Docket No. 306). That opinion discussed and rejected Marvell’s argument that the “Group I” claims¹ are invalid under 35 U.S.C. § 102. (*See generally id.*). However, the Court indicated in that opinion that it was concerned that the claims may instead be invalid under 35 U.S.C. § 112. (*See* Docket No. 306 at 16 n.10).

The Court’s footnote precipitated a second partial summary judgment motion by Marvell on the Group I claims, this time for invalidity under § 112. (*See* Docket No. 337). The Court also interpreted part of the motion as requesting reconsideration of the original opinion. (*See* Docket No. 337 at 17-19). The Court denied Marvell’s motion for summary judgment and reconsideration in its opinion under § 112. (*See* Docket No. 307). Marvell filed the instant motion in response to the Court’s opinion and order. CMU has now replied with supporting brief and exhibits. (*See* Docket No. 379 *eq seq.*). The Court’s analysis follows.

III. LEGAL STANDARD

Motions for reconsideration are granted sparingly “[b]ecause federal courts have a strong interest in finality of judgments.” *Jacobs v. Bayha*, Civ. A. No. 07-237, 2011 WL 1044638, at

¹ The Group I claims include claims 1-5 of the ‘839 Patent and claims 1-2 of the ‘180 Patent.

*2 (W.D.Pa. Mar. 18, 2011). “Because of the interest in finality, at least at the district court level ... the parties are not free to relitigate issues the court has already decided.” *Williams v. City of Pittsburgh*, 32 F.Supp.2d 236, 238 (W.D.Pa.1998) (citing *Rottmund v. Continental Assurance Co.*, 813 F.Supp. 1104, 1107 (E.D.Pa.1992)). The purpose of a motion for reconsideration is ““to correct manifest errors of law or fact or to present newly discovered evidence.”” *Max’s Seafood Café v. Quinteros*, 176 F.3d 669, 677 (3d Cir. 1999) (quoting *Harsco Corp. v. Zlotnicki*, 779 F.2d 906, 909 (3d Cir. 1985)). A Court may grant a motion for reconsideration if the moving party shows: (1) an intervening change in the controlling law; (2) the availability of new evidence which was not available when the court issued its order; or (3) the need to correct a clear error of law or fact or to prevent a manifest injustice. *Max’s Seafood Café*, 176 F.3d at 677 (citing *North River Ins. Co. v. Cigna Reinsurance Co.*, 52 F.3d 1194, 1218 (3d Cir. 1995)).

IV. ANALYSIS

Marvell’s motion relies on the second and third prongs, as Marvell has cited what it claims to be new evidence. It also argues that the Court misunderstood its original “reconsideration” argument and that there are discrepancies between the Court’s § 112 opinion and the record. With respect to the “new evidence” argument, Marvell has cited to and provided the Court with a portion of the transcript of its deposition of CMU’s expert, Professor McLaughlin. (See Docket Nos. 339 at 2-6; 339-1).² CMU opposes the motion on all grounds.

² To the extent that Marvell believed that this “new” evidence was important to its case, the Court notes that the deposition was taken on March 22, 2012. (See Docket No. 339-1 at 1). The Court’s opinion was issued on April 10, 2012. (Docket No. 337). If, as Marvell posits, Prof. McLaughlin’s testimony refuted CMU’s position that the covariance matrix was a parameter, as opposed to an input, then Marvell could have moved to supplement the briefing before the Court issued its last opinion. This would have been in accord with Federal Rule of Civil Procedure, which encourages the “just, speedy, and inexpensive determination” of every federal civil case. FED.R.CIV.PRO. 1. An evidentiary supplement is much more efficient than a new round of motions and brief.

a. New Evidence

In its last opinion, the Court determined that, in order to distinguish between a single function and a set of functions, one must determine whether a given variable element of an equation is an input or a parameter. (*See* Docket No. 337 at 12-13). Because it is clear that a single function may have multiple inputs, the Court determined that a single function may have any number of inputs, but it will remain a *single* function. This conclusion is fully reconcilable with the Court’s construction of the claim term “function,” *i.e.*, “a mathematical function that uniquely associates members of a first set with members of a second set.” (*See* Docket No. 337 at 13). In the context of a single-input function, the first set is the input set (the “domain”), and the second set is the output set (the “range”). (*Id.* at 12). In a multi-input function, the first set is the combination of inputs and the second set remains the output.

However, the Court concluded that if a given variable is a *parameter*, *i.e.* a variable element in the equation that is external to both sets, then the unique association between sets breaks down, and multiple functions result. (*See* Docket No. 337 at 15). The Court observed that this conclusion was bolstered by Marvell’s original position with respect to its hypothetical “associate bonus function,” $B_i(x) = c_i \cdot X$. Specifically, Marvell took the position that changing the “parameter,” c_i , in this equation actually resulted in different functions. (*Id.* at 13). Thus, Marvell implicitly relied on the same distinction between inputs and parameters that the Court eventually incorporated into its analysis.

Marvell’s new evidence argument addresses the Court’s discussion of Figure 3A of the ‘389 Patent, wherein the Court recognized that “Figure 3A appears to indicate that C_i is an input to the branch metric computation module.” (Docket No. 337 at 14). This is demonstrated by

Equation 16 of that patent, which shows that $\sigma_i^2 = \frac{\det C_i}{\det c_i}$. (*See id.*). However, based on the plain language of the patent, the Court found that C_i must be a parameter because the patent expressly stated that the branch metric “is a function of the observed samples.... It is also dependent on the postulated sequence of written symbols.” (*See* Docket No. 337 at 15). The CMU Patents do not refer to the covariance matrices in a similar manner.

Marvell argues that the alleged new evidence it has provided demonstrates that the Court’s conclusion on this point is incorrect. Instead, Marvell asserts, a person of ordinary skill in the art would conclude that C_i is an input, not a parameter. (*See* Docket No. 339 at 2-6). Its position is largely based on the deposition of Prof. McLaughlin, CMU’s expert, whom Marvell recognizes as a person of at least ordinary skill in the art. (*See* Docket No. 339 at 4).

The provided transcript does, indeed, show that Prof. McLaughlin refers to σ_i^2 as an input during his testimony. (*See* Docket No. 339 at 3-6 (citing relevant portions of the deposition transcript)). For example, Marvell relies upon the following colloquy during Prof. McLaughlin’s deposition:

- Q And you see the – and **what is the input to Circuit 50?**
A It is the variance sigma squared sub i....
Q **What does the input to Circuit 50 represent?**
A It is – **it is a variance which is a statistic, so it is input into the circuit.**

(*See* Docket No. 339 at 3) (emphases in Marvell’s brief). Marvell likewise points to another portion of Prof. McLaughlin’s deposition in which he discusses “signal samples r sub i and the – if I remember correctly the target values m sub i ” as “two inputs.” (Docket No. 339 at 5).

Because C_i is an element of σ_i^2 , it would presumably be an “input,” as well. However, this testimony does not support Marvell’s position, as it recognizes the very point which the

Court addressed in its § 112 opinion: simply that σ_i^2 is an input into the circuit in Figure 3A. (See Docket No. 337 at 14-15 (recognizing that C_i is an input into the “branch metric computation module,” but determining that it is a parameter)). The fact that all three variables – σ_i^2 , r_i , and m_i – are inputs to the *circuit* described in Figure 3A does not necessarily mean that they are inputs to the *function* at issue. Again, the Court refers to the language from the ‘839 Patent, which reads “[t]he metric is a function of the observed samples $r_i, r_{i+1}, \dots, r_{i+L}$. It is also dependent upon the postulated sequence of written symbols $a_{i-K_i}, \dots, a_{i+L+K_i}$.” ‘839 Patent at col. 5, lns. 48-52. The Court understands this language in the patent to mean that the *metric*, as opposed to the circuit which calculates the metric, has only two inputs – observed samples and postulated values.

The cited portions of Prof. McLaughlin’s deposition testimony do not contradict this finding by the Court. As it stands, it appears that the circuit simply performs the calculations described in the function – but that does not mean that the circuit *is* the function. To reach the point that Marvell is attempting to reach, the Court would need evidence that a person of ordinary skill in the art would interpret the patent in that manner. Such evidence is not present here. The motion for reconsideration is denied to the extent that Marvell relies on this justification.

b. The “Further Modified” Branch Metric

Marvell also argues that the Court did not address the specific argument made in Marvell’s second motion for summary judgment, that the “further modified” branch metric anticipates the Group I claims. Specifically, Marvell argues that the Court failed to examine its argument that the “further modified” metric of U.S. Patent No. 6,282,251 (the “‘251 Patent”) and Equation 13 of the CMU Patents include the same variables. (Docket No. 339 at 6-7). This

proposition certainly is true, insofar as the “further modified” metric of the ‘251 Patent and Equation 13 of the CMU Patents do both refer to the present signal sample, the present target values, prior (historical) noise terms, and noise statistics (including the covariance matrix). (See Docket No. 339 at 7). CMU’s expert, Prof. McLaughlin, however, has testified that the tap weight configuration disclosed in the ‘251 Patent is “constant across all branches and across time.” (Docket No. 325-2 at ¶ 31). It is this distinction – the variability of the tap weights in the CMU Patents versus the constancy of the tap weights in the ‘251 Patent – upon which the Court relied in its previous opinion. Given that Prof. McLaughlin has opined that the constancy of the ‘251 Patent’s tap weights does not change in the “further modified” metric, in contrast to Marvell’s position, it is inappropriate to grant summary judgment where there is a dispute as to a material fact. See FED.R.CIV.P. 56(a). Marvell’s motion for reconsideration is also denied on this ground.

c. Other Evidence

Marvell also seeks reconsideration based on supposed “additional factual discrepancies between the opinion and the record.” (Docket No. 339 at 7-9). Marvell raises 7 objections to the Court’s statements in its § 112 opinion, each of which are derived from its rendition of the facts, and are, in most cases, contradicted by CMU’s rendition, rendering summary judgment inappropriate. See *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 149 F.3d 1309, 1315 (Fed. Cir. 1998) (In analyzing a summary judgment motion, a court should “view the evidence in a light most favorable to the opposing party and resolve doubts in its favor.”).

Returning to Marvell’s objections, it first asserts that the ‘251 Patent, which was the prior art addressed in the Court’s § 102 opinion, does not refer to setting tap weights at the “design stage.” (Docket No. 339 at 8). Second, Marvell observes that the Group I claims do not include

any “tap weight” limitations. (*Id.*). Third, Marvell posits that if the ‘251 Patent takes into account correlated noise and signal-dependent noise, then it must be done through a “set” of functions. (*Id.*). Next, Marvell argues that it has shown that persons of ordinary skill, including Glen Worstell, the inventor of the ‘251 Patent, and Mark Kryder, a professor at CMU, testified that there is no distinction between the Group I claims and the ‘251 Patent, while CMU has failed to produce evidence from a person of ordinary skill that demonstrates a distinction. (Docket No. 339 at 8-9). Finally, Marvell cites Worstell’s declaration for the proposition that he believed his tap weights would be adaptive. (*Id.* at 9 (citing Docket No. 251-12 at 11, fn. 5)).

With respect to the first two points, the Court agrees that the ‘251 Patent does not make explicit reference to setting tap weights at the design stage. *See, generally*, ‘251 Patent. Nor do the Group I claims make reference to “tap weights”. In this Court’s view, though, there are no discrepancies between the opinion and the record. The ‘251 Patent does not – according to CMU’s expert – disclose tap weights that can vary during operation of the detector. Rather, it appears that the tap weights are fixed during operation and can only be changed manually. (*See* Docket No. 325-2 at ¶ 31). As to Marvell’s arguments, applying the facts as CMU has presented them, the ‘251 Patent’s tap weights are set, by design, prior to operation. And although the Group I claims do not use the term “tap weights,” the Court’s construction of the claim term “function” has rendered the tap weight configurations relevant to the determination of whether “selection” can occur as required in the Group I claims. (*See* Docket Nos. 306 at 15-16; 337 at 5-7). Further, as CMU points out in its brief in opposition (Docket No. 379 at 16), it is disingenuous for Marvell to first assert that tap weights are involved in the function selection process (*see* Docket No. 219 at 13), then argue that the claims make no reference to tap weights.

(Docket No. 339 at 8). Thus, the Court acknowledges Marvell’s first two objections, but does not find them persuasive.

The foregoing discussion is also pertinent to Marvell’s third objection, pertaining to the “further modified” branch metric. As the Court has made clear, its view is that a set of functions results from variation of certain elements of the equations described in the CMU patents. (*See* Docket No. 337 at 13-15). The evidence – taken in the light most favorable to CMU – indicates that the ‘251 Patent discloses only constant tap weights, which in turn does not result in a set of functions under the Court’s construction, regardless of whether the ‘251 Patent’s “further modified” metric accounts for signal-dependent or correlated noise. Prof. McLaughlin’s recognition that the “selecting” step was known in the prior art is irrelevant here, as the Court looks only to the allegedly anticipatory prior art – the ‘251 Patent – for purposes of the § 102 analysis. Prof. McLaughlin’s references to other prior art during his deposition do not show that the ‘251 Patent disclosed a selecting step that would anticipate the same step in the CMU Patents. (*See* Docket No. 339-1 at 265-268).

With respect to the fourth objection, the Court again agrees with CMU. Marvell states that a person of ordinary skill – Worstell – testified that there is no distinction between the ‘251 Patent and the Group I claims. (Docket No. 339 at 8-9). While an inventor’s testimony may be relevant in analyzing a patent, it “is entitled to little weight in the face of evidence to the contrary.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 991 n.3 (Fed. Cir. 1995) (citing *North American Vaccine v. American Cyanamid Co.*, 7 F.3d 1571, 1577 (Fed. Cir. 1993); *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387 (Fed. Cir. 1992)). As CMU observes, Worstell was unable to actually point to a place in the ‘251 Patent which describes adaptive tap weights. (Docket No. 379 at 18). Instead, Worstell simply “assumed” that the tap weights could

vary. (Docket No. 339 at 9). McLaughlin, as emphasized above, observed a difference between the patents in that the ‘251 Patent’s tap weights are fixed, while the CMU Patents’ covariance matrices are time-variant. (Docket No. 325-2 at ¶ 31). Once again, there is no discrepancy with the record simply because the Court adopted in its opinion the non-moving party’s version of the facts at summary judgment.³

Next, Marvell criticizes CMU for failing to present testimony from a person of ordinary skill in the art to support its arguments, claiming that Prof. McLaughlin is an individual who possesses “well beyond the level of ‘ordinary’ skill in the art.” (Docket No. 339 at 9). First, an expert is “well suited to assist the court” in determining what would be understood by a person of ordinary skill. *Moore v. Wesbar Corp.*, 701 F.2d 1247, 1253 (7th Cir. 1983). Second, Marvell’s experts on validity (Profs. Proakis⁴ and Wolf⁵) are likewise not persons of mere ordinary skill. Third, as the Court has recognized above, Worstell – presumably a person of ordinary skill – was unable to point to anything in the ‘251 Patent that indicates that the tap weights are time-variant, while the plain language of the CMU Patents makes clear that the disclosed tap weight configuration is. Hence, this criticism is without merit.

³ The Court is to give the non-moving party every benefit of the doubt in resolving factual disputes at the summary judgment stage. *See Ethicon*, 149 F.3d at 1315.

⁴ Dr. Proakis received his Bachelors in Electrical Engineering from the University of Cincinnati in 1959, his Masters in Electrical Engineering from M.I.T. in 1961, and his Ph.D. in Engineering from Harvard in 1967. (Docket No. 251-11 at 2). He is an Adjunct Professor at the University of California at San Diego and Professor Emeritus and Research Professor at Northeastern University.

⁵ Dr. Wolf, now deceased, received his Bachelor’s degree in Electrical Engineering from the University of Pennsylvania in 1956 and his M.S.E., M.A., and Ph.D. in Electrical Engineering from Princeton University in 1957, 1958, and 1960, respectively. (Docket No. 220-9 at 3). At the time he submitted his declaration, he was the Stephen O. Rice Professor of Magnetism in the Electrical and Computer Engineering Department and the Center for Magnetic Recording Research at the University of California, San Diego, where he researched signal processing for storage systems. (*Id.*).

Sixth, Marvell points to the deposition testimony of Prof. Mark Kryder as evidence that there is no distinction between claim 1 of the '839 Patent and the disclosure of the '251 Patent. (Docket No. 339 at 9). Specifically, in response to the question of whether he could identify anything that would have been new in the CMU patents, Prof. Kryder responded that "I'm going to say no." (Docket No. 339-2 at 92-93). As CMU points out, though, Prof. Kryder repeatedly indicated that he "do[es] not know signal processing, and you [Marvell] are asking me a question that I cannot answer." (Docket No. 379-7 at Ex. 15, pg. 81). He also testified that he is "really not qualified to answer" questions about the '251 Patent. (*Id.* at 108). The Court again refers to Prof. McLaughlin's assertions to show that there is a dispute as to whether there truly is a difference between the '251 Patent and the CMU Patents. (Docket No. 325-2 at ¶ 31).

Marvell's seventh objection is again related to the variable tap weight issue. Worstell, the inventor of the '251 Patent, claims that "it was assumed at the time of filing of my Seagate patent that all tap weights W_i could vary during operation." (Docket No. 251-12 at 11 n.5). Worstell continues, "prior to the time I filed the application for my Seagate patent, I was working on adaptive FIR time filters..." (*Id.*)⁶ What Worstell describes as his intent in filing the patent is irrelevant here, as the motion underlying this reconsideration was brought under 35 U.S.C. § 102. In order to anticipate under § 102, a single prior art reference must, within its four corners, disclose every element of the claimed invention such that a person of ordinary skill in the art would understand the invention and be able to practice it. *See Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) ("invalidity by anticipation requires that the four corners of a single, prior art document describe every element of the claimed invention,

⁶ The Court notes that the excerpt cited by Marvell would not establish that variable tap weights existed anyway. The evidence cited simply indicates that Worstell "was working on" adaptive filters, but not that they had been reduced to practice, nor that Worstell's work was published in a manner that would qualify such filters as part of the '251 Patent.

either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.”). Prof. McLaughlin’s view shows that a person of skill in the art would interpret the ‘251 Patent as disclosing a tap weight configuration that is “constant across all branches and across time.” (Docket No. 325-2 at ¶ 31). Thus, given the procedural posture of this case, there is no discrepancy between the Court’s decision and the record. The Court denies reconsideration on this additional ground.

V. CONCLUSION

For the foregoing reasons, Marvell’s motion for reconsideration (Docket No. 339) is denied. An appropriate Order follows.

s/ Nora Barry Fischer
Nora Barry Fischer
United States District Judge

Date: June 12, 2012
cc/ecf: All counsel of record.